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SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

AGRICULTURAL SCIENCES P1

MAY/JUNE 2025

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 11 pages.



SECTION A**QUESTION 1**

- | | | | | |
|-----|--------|--------------------------------------|----------|------|
| 1.1 | 1.1.1 | D ✓✓ | | |
| | 1.1.2 | C ✓✓ | | |
| | 1.1.3 | B ✓✓ | | |
| | 1.1.4 | C ✓✓ | | |
| | 1.1.5 | C ✓✓ | | |
| | 1.1.6 | A ✓✓ | | |
| | 1.1.7 | B ✓✓ | | |
| | 1.1.8 | D ✓✓ | | |
| | 1.1.9 | B ✓✓ | | |
| | 1.1.10 | A ✓✓ | (10 x 2) | (20) |
| 1.2 | 1.2.1 | B only ✓✓ | | |
| | 1.2.2 | B only ✓✓ | | |
| | 1.2.3 | None ✓✓ | | |
| | 1.2.4 | Both A and B ✓✓ | | |
| | 1.2.5 | A only ✓✓ | (5 x 2) | (10) |
| 1.3 | 1.3.1 | Digestibility coefficient ✓✓ | | |
| | 1.3.2 | Vector ✓✓ | | |
| | 1.3.3 | Caruncles/nodules ✓✓ | | |
| | 1.3.4 | Amnion ✓✓ | | |
| | 1.3.5 | Electro ejaculator ✓✓ | (5 x 2) | (10) |
| 1.4 | 1.4.1 | Cafeteria style/free choice/ad lib ✓ | | |
| | 1.4.2 | Rigor mortis ✓ | | |
| | 1.4.3 | Super ovulation ✓ | | |
| | 1.4.4 | Fallopian tubes/oviducts ✓ | | |
| | 1.4.5 | Oestrogen ✓ | (5 x 1) | (5) |

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION****2.1 The alimentary canal of two farm animals****2.1.1 Identification of the diagram**

Diagram B ✓

(1)

2.1.2 Justification of the answer

- Presence of a large rumen in relation to the abomasum ✓
- Presence of a smaller abomasum in relation to rumen ✓
- Fully developed fore-stomach ✓
- Absence of the oesophageal groove ✓

(Any 1) (1)

2.1.3 Function of the oesophageal groove

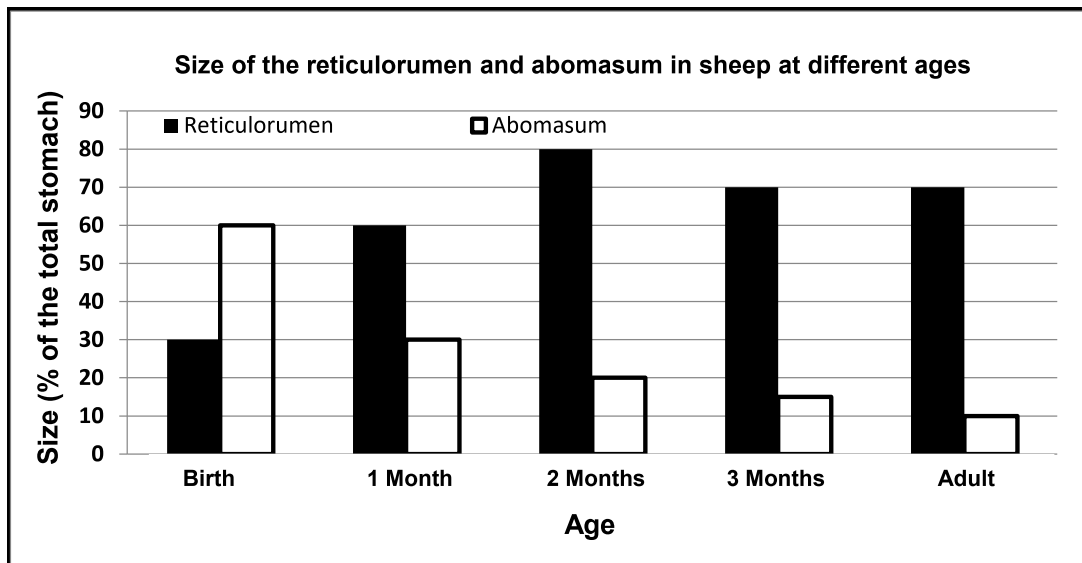
It channels milk to pass from the oesophagus to the abomasum ✓

(1)

2.1.4 Identification of the part

Abomasum ✓

(1)

2.2 The bar graph**2.2.1 Bar graph on the size of the reticulorumen and abomasum of sheep at different ages****CRITERIA/RUBRIC/MARKING GUIDELINES**

- Correct heading (with both variables) ✓
- X-axis: Correctly calibrated with label (Age) ✓
- Y-axis: Correctly calibrated with label (Size) ✓
- Correct units (% of the total stomach) ✓
- Combined bar graph ✓
- Accuracy (80% + correctly plotted) ✓

(6)



2.3 The composition of a ration**2.3.1 Indication of the type of farm animal**

Non-ruminant/monogastric ✓ (1)

2.3.2 Reason

- The ration contains high quantities of roughage/hay ✓ which cannot be digested by non-ruminants ✓
- The ration contains urea ✓ which cannot be digested by non-ruminants ✓ (Any 1) (2)

2.3.3 Identification of a feed

(a) Protein-rich roughage - Lucerne hay ✓ (1)

(b) Carbohydrate-rich concentrate - Wheat meal ✓ (1)

2.4 The digestibility of feeds**Calculation of dry matter of the feed in kg**

- $25\text{kg} \times 0,15 = 3,75\text{kg}$ OR $\frac{15}{100} \times 25 = 3,75\text{kg}$ ✓
- $25\text{kg} - 3,75\text{kg} = 21,25\text{kg}$ ✓

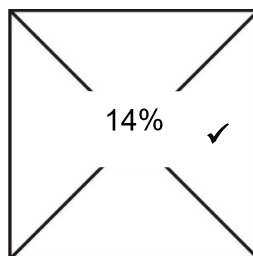
OR

- $\frac{85}{100} \times 25\text{kg}$ ✓
- $= 21,25\text{kg}$ ✓ (Any 2) (2)

2.5 The Pearson square**2.5.1 The Pearson square method**

Oatmeal: 12% DP

14 parts ✓



Fishmeal: 28% DP

2 parts ✓

Ratio: Oatmeal to fishmeal = 14 : 2 / Fishmeal to oatmeal = 2 : 14 ✓ (4)**2.5.2 Calculation of the percentage of fish meal in the mixture**

- $2 + 14 = 16$ ✓
- $\frac{2}{16} \times 100$ ✓
- $= 12,5\%$ ✓ (3)



2.6 The nutrients available in two different feeds**2.6.1 Identification of a feed**

- (a) **Fattening of lambs - FEED B ✓** (1)
 (b) **Lactating cows - FEED A ✓** (1)

2.6.2 Justification of FEED A

High in protein content/high digestible protein of 17% ✓ (1)

2.6.3 Calculation of the nutritive ratio of feed A

- $NR = 1: \frac{\%TDN - \%DP}{\%DP}$ ✓
- $= 1: \frac{83\% - 17\%}{17\%}$ ✓
- $= 1: 3,9 / 1:4$ ✓

OR

- $NR = 1: \frac{\%DNNS}{\%DP}$ ✓
- $= 1: \frac{66\%}{17\%}$ ✓
- $= 1: 3,9 / 1:4$ ✓ (3)

2.7 The components of the feed**2.7.1 Identification of**

- A - Carbohydrates ✓** (1)
E - Maltose/glucose ✓ (1)

2.7.2 Name of enzyme

- C - Lipase ✓** (1)

2.7.3 Feed components

- (a) **Other organic component - Vitamin/Protein ✓** (1)
 (b) **Inorganic component - Minerals ✓** (1)

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QUESTION 3 : ANIMAL PRODUCTION, PROTECTION AND CONTROL**3.1 Production systems****3.1.1 Identification of the production systems**

- (a) **FARMER B** - Intensive ✓ (1)
 (b) **FARMER A** - Extensive ✓ (1)

3.1.2 TWO reasons for intensive production system

- Animals are provided with feed ✓
- Many workers/9 workers ✓
- High stock density/540 sheep on 30 ha ✓
- More capital invested/feedlot/housing/2 feed sheds/2 boreholes ✓
 (Any 2) (2)

3.1.3 TWO factors a farmer should consider to increase production

- Nutrition/feeding ✓
- Breeding/reproduction ✓
- Environment/shelter ✓
- Management ✓
 (Any 2) (2)

3.2 Pigs housing facility**3.2.1 Identification of the letter**

- (a) A ✓ (1)
 (b) B ✓ (1)
 (c) C ✓ (1)

3.3 Handling of a chick**3.3.1 The reason for handling the chick**

Application of medication/vaccinating/immunising/inoculating ✓ (1)

3.3.2 Name the tool used

Syringe ✓ (1)

3.3.3 TWO basic guidelines for handling poultry

- Approach the birds in a quiet, easy moving manner that does not raise alarm/do not chase chickens around ✓
- Carry them by both legs or wings ✓
- Never carry them by head, one wing/leg ✓
- Do not grab chickens by the feathers/tail ✓
 (Any 2) (2)

3.3.4 TWO tools/equipment to restrain farm animals

- Crush/head gate/neck clamp/chute/race ✓
- Tilting/restraining table ✓
- Rope ✓
- Harness ✓
- Halter ✓
- Nose ring/nose pliers ✓
 (Any 2) (2)



3.4 Methods to administer medication

- 3.4.1 Plunge dipping ✓ (1)
- 3.4.2 Dosing/drenching ✓ (1)
- 3.4.3 Vaginal insertion ✓ (1)
- 3.4.4 Topical administration ✓ (1)

3.5 Animal diseases**3.5.1 Identification of the animal diseases**

- (a) Anthrax ✓ (1)
- (b) Foot & Mouth Disease (FMD) ✓ (1)
- (c) Coccidiosis ✓ (1)
- (d) Lumpy wool ✓ (1)

3.5.2 Name of the pathogen

- (a) 3.5.1(d) - Fungi/Dermatophilus congolensis/
Pseudomonas aeruginosa ✓ (1)
- (b) 3.5.1(a) - Bacteria/Bacillus anthracis ✓ (1)

3.6 The life cycle of parasite**3.6.1 Name of the parasite**

- Liver fluke ✓ (1)

3.6.2 Identification of the hosts

- (a) Primary host - Cattle/sheep ✓ (1)
- (b) Secondary host - Snail ✓ (1)

3.6.3 Measure to break the cycle of a parasite

- Keep animals away from wet pastures ✓
- Practice rotational grazing ✓ (Any 1) (1)

3.7 Parasites affecting farm animals**3.7.1 Classification of the parasites**

- External/ecto parasites ✓ (1)

3.7.2 Identification of

- PARASITE A** - Blowfly ✓ (1)
- PARASITE C** - Mite ✓ (1)

3.7.3 ONE management practice to prevent the infestation of a blowfly

- Clipping and cleaning of coat ✓
- Timing the shearing and crutching of wool ✓
- Tail docking ✓
- Lambing should be after shearing ✓
- Breeding of resistant animals ✓
- Proper waste management/judicious blowfly control measures ✓
- Keep the living areas of animals clean ✓
- Treat/cover open wounds ✓ (Any 1) (1)



3.8 Urea poisoning

3.8.1 ONE symptom of urea poisoning

- Bloating ✓
- Tetany/painful muscular cramps ✓
- Difficult/rapid breathing ✓
- Excessive salivation ✓
- Frequent defaecation ✓
- Constipation ✓
- Staggering ✓
- Nervous symptoms ✓

(Any 1) (1)

3.8.2 Method to treat animals with urea poisoning

- Removal of animals from the source of poisoning ✓
- Administer vinegar/acetic acid to neutralise the ammonia (dilute one litre of vinegar with four litres of water using stomach tube) ✓
- Administer large amounts of cold water to dilute the rumen content and slow the rate of urease activity ✓

(Any 1) (1)

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QUESTION 4: ANIMAL REPRODUCTION**4.1 The reproductive system of a male farm animal****4.1.1 Identification of****A** - Cowper's glands/bulbo-urethral glands ✓ (1)**D** - Vas deferens/ sperm duct/ductus deferens/seminal tube ✓ (1)**4.1.2 Letter of the part**

(a) B ✓ (1)

(b) E ✓ (1)

(c) C ✓ (1)

(d) F ✓ (1)

(e) G ✓ (1)

4.1.3 TWO factors causing sterility in bulls

- Deformed reproductive organs ✓
 - Diseases ✓
 - Congenital defects (hypoplasia/cryptorchidism/hermaphroditism) ✓
 - Genetic defects ✓
 - Azoospermia ✓
- (Any 2) (2)

4.2 Gametogenesis in a farm animal**4.2.1 Identification of the type of gametogenesis**

Oogenesis/ovogenesis ✓ (1)

4.2.2 Labelling**B** - Primary oocyte ✓ (1)**E** - Ovum/egg cell ✓ (1)**4.2.3 Types of cell division**(a) **A** - Mitosis ✓ (1)(b) **D** - II Meiotic division ✓ (1)**4.3 Oestrus synchronization****4.3.1 Identification of the reproductive technique**

Synchronisation of oestrus ✓ (1)

4.3.2 TWO disadvantages of synchronisation of oestrus

- Requires high levels of technology ✓
 - Conditions such as poor nutrition and poor health may affect oestrus synchronisation negatively ✓
 - High labour costs during heat detection/high costs for good facilities/expensive ✓
 - Time intensive ✓
- (Any 2) (2)



4.4 Artificial insemination**4.4.1 Identification of the reproductive technique**

Artificial Insemination/AI ✓

(1)

4.4.2 TWO advantages of artificial insemination

- Reduces sexually transmitted diseases ✓
- Cost effective/cheaper than maintaining bulls/no need to buy expensive bulls ✓
- Semen of one bull can be used to inseminate many cows ✓
- Rapid method to improve the quality of the herd ✓
- Imported semen can be used ✓
- Valuable tool in assisting with progeny testing/improves the genetic value of the herd ✓
- Higher conception rate than with natural mating ✓
- Can be applied where mating is impossible ✓
- Can be used long after the death of the bull ✓

(Any 2)

(2)

4.4.3 ONE basic requirement for semen collection

- Hygienic conditions/sterile equipment ✓
- Semen collection point should be closer to laboratory ✓
- Male animal should be healthy and clean ✓
- Collection vial must be warmed ✓
- Equipment must be readily available ✓
- The floor should not be slippery ✓
- Presence of a teaser animal ✓
- Experienced/skilled personnel ✓

(Any 1)

(1)

4.4.4 ONE characteristic of a good quality semen

- It must be viable/less than 15% dead sperm cells ✓
- Semen should be milky/opaque in colour ✓
- Sticky with a characteristic smell ✓
- No blood in the semen ✓
- Sperm cells should have normal morphology/not deformed ✓
- High concentration semen ✓
- High mobility of sperm cells ✓
- Correct pH between 6,4 to 6,9 ✓

(Any 1)

(1)

4.5 Cloning**4.5.1 Type of cloning**

Therapeutic ✓

(1)

4.5.2 Purpose of therapeutic cloningProduce embryonic stem cells that can be used for cell therapy/
develop new animal treatments ✓

(1)

4.5.3 Name of a process

Enucleation ✓

(1)

4.5.4 Reason for enucleationTo prevent the genetic material of an egg cell from interfering with the
process ✓

(1)



4.6 The stage of parturition**4.6.1 Stage of parturition**

Ejection/expulsion of the foetus ✓ (1)

4.6.2 Stage following ejection of foetus

Ejection/expulsion of placenta ✓ (1)

4.6.3 ONE factor causing placenta retention

- Deficiency of vitamin A ✓
 - Diseases/infections in the reproductive tract ✓
 - Exhaustion ✓
 - Mineral deficiencies ✓
 - Hereditary defects ✓
 - Over-conditioning of cows ✓
 - Inertia of the uterus ✓
 - Metabolic disorders ✓
 - Failure of the foetal membranes and maternal tissues to break after parturition ✓
 - Use of hormones to induce parturition ✓
 - Dystocia/prolonged labour ✓
 - Hormonal imbalances ✓
 - Multiple births/twinning ✓
- (Any 1) (1)

4.6.4 ONE calf related conditions

- High birth weight ✓
 - Malformed foetus/deformities ✓
 - Deviation of the head ✓
 - Flexion of the elbow ✓
 - Retention of one or both forelegs ✓
 - Hydrocephalus ✓
 - Hydrops Fetalis ✓
 - Posterior presentation ✓
 - Multiple births/twinning ✓
 - Death of the foetus ✓
- (Any 1) (1)

4.7 Milk production**4.7.1 Indication of**

- (a) **A to C** - Lactation/milk production curve ✓ (1)
- (b) **B** - Peak period ✓ (1)

4.7.2 Duration of lactation in days

305 - 310 days ✓ (1)

4.7.3 Explanation of the relationship between milk production and butterfat content in week 8

When the milk production is at its peak ✓ the butterfat content is at its lowest level ✓ (2)

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TOTAL SECTION B: 105**GRAND TOTAL: 150****SA EXAM PAPERS**

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